

2004 GALVESTON BAY INVASIVE SPECIES RISK ASSESSMENT  
INVASIVE SPECIES SUMMARY

Created by: Environmental Institute of Houston, University of Houston-Clear Lake  
and the Houston Advanced Research Center

<b>Common Name:</b> Chinese Privet and Japanese Privet
<b>Latin Name:</b> <i>Ligustrum sinense</i> and <i>Ligustrum japonicum</i>
<b>Category:</b> Terrestrial Plants
<b>Place of Origin:</b> East Asia
<b>Date of Introduction:</b> Unknown <i>"Ligustrum</i> spp. have been cultivated and developed into several horticultural varieties, and were introduced to North America as a common hedge in landscaping." <a href="http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html">http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html</a> (Accessed 18 March 2003).
<b>States Effected:</b> Alabama, Arkansas, Connecticut, Florida, Georgia, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, Missouri, New Jersey, North Carolina, Oklahoma, Puerto Rico, Rhode Island, South Carolina, Tennessee, Texas, Virginia. <a href="http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=LISI">http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=LISI</a> (Accessed 18 March 2003).  <i>"L. japonicum:</i> Alabama, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia, and Puerto Rico  <i>L. sinense:</i> Alabama, Arkansas, Connecticut, Florida, Georgia, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, Missouri, New Jersey, North Carolina, Oklahoma, Rhode Island, South Carolina, Tennessee, Texas, and Virginia." <a href="http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html">http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html</a> (Accessed 18 March 2003).
<b>Life History:</b> <i>"Ligustrum</i> spp. are perennial shrubs that grow readily from seed or from root and stump sprouts. They can escape from cultivation when the fruits are consumed by wildlife, particularly birds, which often excrete the seeds unharmed at distant locations where they may germinate and become established. Germination rates have been variously reported as low as 5%-27% (Tennessee Exotic Plants Council 1996) and as high as 77% (Schopmeyer 1974). Unlike most woody species, experimental defoliation did not result in reduced percentages of flowers producing fruits, decreased seed number, or decreased seed quality (Obeso and Grubb 1993)."  <i>"Ligustrum</i> spp. leaves are high in phenolic compounds that defend against herbivores, especially insects. These work by inhibiting digestive enzymes and proteins (Konno et al. 1998). Despite this, <i>L. sinense</i> has been identified as an important forage plant for deer in the southeastern U.S. (Stromayer et al. 1998)." <a href="http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html">http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html</a> (Accessed 18 March 2003).
<b>Growth/Size:</b> 2. "Some <i>Ligustrum</i> spp. can grow to 5 m tall and have a stem diameter of 2.5-25 cm. <i>Ligustrum</i> spp. bark is whitish-tan to gray in color and smooth in texture. Slender twigs are straight, rounded or four-angled below the nodes, and gray-green in color. Winter buds are ovoid with two outer scales. Terminal buds are present. Leaves are elliptic to ovate in shape, oppositely arranged on slender twigs, often leathery and thick. Flowers have both male and female parts, and the corollas are white. The calyx is small, obconic or campanulate, and 4-toothed. Each flower has petals that are fused into a tube below with four separate lobes above. Flowers are borne on small panicles terminating the main axis and on short lateral branches. Bloom time is usually June-July. The fruit is a subglobose or ovoid drupe containing 1-4 seeds. Fruit clusters generally ripen during September and October and persist through the winter. Mature specimens can produce hundreds of fruit (Rehder 1977)." <a href="http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html">http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html</a> (Accessed 18 March 2003).
<b>Habitat:</b> <i>"In North America, Ligustrum</i> spp. often grow along roadsides, in old fields and in other disturbed habitats and in a variety of undisturbed natural areas. Examples of <i>Ligustrum</i> invasions include:  <i>L. sinense</i> has been reported in bogs, an oak-hickory-pine forest, a longleaf pine-turkey oak forest, and mesic hardwood forests in Alabama. In Arkansas, <i>L. sinense</i> has been reported in virtually all non-xeric habitats. In Georgia, <i>L. sinense</i> has been reported in floodplain/wetland habitats, and in North Carolina, in woodland edges (Randall and Rice. unpublished.).  In New Zealand, <i>L. sinense</i> is found in alluvial forest remnants, waste places, shrublands, and open stream systems, particularly in coastal areas. <i>L. sinense</i> is widespread and common, especially near towns. It is a common farm hedging plant. <i>L. lucidum</i> is found in forests (lowland and coastal), forest fragments, shrublands, along roadsides, in farm hedges, wastelands, and domestic gardens (New

Zealand Weeds Web Site)." [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

**Attitude (aggressive, etc.):**

1. "Privet is highly invasive and is a major threat to forest biodiversity in La Réunion and Mauritius. Its high germination level, rapid growth rate, shade tolerance and very low mortality, combined with massive fruit production and dispersal by birds contribute to its ability to invade intact forests."... "This species has been nominated as among 100 of the "World's Worst" invaders." <http://www.issg.org/database/species/ecology.asp?si=90&fr=1&sts=> (Accessed 18 March 2003).
2. "*L. japonicum* and *L. sinense* invade woodlands in the eastern and southeastern U.S. (Faulkner et al. 1989; Stone 1997). Forest gaps can also become invaded since birds often disperse *Ligustrum* seeds." [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

**Physical Description:**

"*Ligustrum* spp. are deciduous, semi-evergreen, or evergreen shrubs and small trees in the Oleaceae (olive family). There are approximately 50 *Ligustrum* species that are native to Europe, North Africa, and Asia.

Some *Ligustrum* spp. can grow to 5 m tall and have a stem diameter of 2.5-25 cm. *Ligustrum* spp. bark is whitish-tan to gray in color and smooth in texture. Slender twigs are straight, rounded or four-angled below the nodes, and gray-green in color. Winter buds are ovoid with two outer scales. Terminal buds are present. Leaves are elliptic to ovate in shape, oppositely arranged on slender twigs, often leathery and thick. Flowers have both male and female parts, and the corollas are white. The calyx is small, obconic or campanulate, and 4-toothed. Each flower has petals that are fused into a tube below with four separate lobes above. Flowers are borne on small panicles terminating the main axis and on short lateral branches. Bloom time is usually June-July. The fruit is a subglobose or ovoid drupe containing 1-4 seeds. Fruit clusters generally ripen during September and October and persist through the winter. Mature specimens can produce hundreds of fruit (Rehder 1977)." [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

"*L. japonicum* generally grows to 3 m, rarely to 6 m. Leaves are broad-ovate to ovate-oblong, 4-10 cm long, obtusely short-acuminate or acute to obtuse, rounded at the base with reddish margins and midrib and with 4-5 pairs of indistinct veins. Petioles are 6-12 mm long. Panicles are 6-15 cm long. Flowers are short-stalked with the corolla tube longer than the calyx. Stamens are slightly longer than the corolla lobes." [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

"*L. lucidum* grows as a large shrub or medium-sized tree, to 10 m high, with spreading branches. Leaves are ovate to ovate-lanceolate, 8-12 cm long, acuminate or acute, usually broad-cuneate with 6-8 veins, usually distinct above and beneath. Petioles are 1-2 cm long. Panicles are 12-20 cm long and nearly as wide. Flowers are subsessile. The corolla tube is as long as the calyx. Stamens are as long as the corolla lobes. Fruits are oblong, 1 cm long, bluish or purplish-black." [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

"*L. sinense* is a shrub or small tree to 7 m. Leaves are elliptic to elliptic-oblong, 3-7 cm long, acuminate, acute to obtuse, dull green above, pubescent on the midrib below. Petioles are 6-15 mm long. Flowers are small, distinctly stalked, on panicles 10-16 cm long. Fruits are dull black." [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

Management Recommendations / Control Strategies: include references for existing site-specific strategies

**MANAGEMENT:**

**"Potential for Restoration of Invaded Sites:**

In North America, *Ligustrum* spp. have no important pests or predators. The various species are widespread and occasionally locally abundant. Manual and mechanical, environmental/cultural, and chemical methods are all useful in varying degrees in controlling *Ligustrum* spp. Fire management may be useful in some cases where the density of *Ligustrum* spp. is low and sufficient fuels available. Restoration potential is likely to be lowest where *Ligustrum* spp. occur in high densities and there is a high likelihood of continued dispersal of seeds into the restoration area. *Ligustrum* spp. have a high degree of reproductive vigor, a wide range of adaptability, and, in its present settings, few pests and predators. *Ligustrum* spp. produce large numbers of viable seed that are readily dispersed by birds and germinate at high rates in a wide range of conditions.

The potential for large-scale restoration of unmanaged natural areas or wildlands infested with *Ligustrum* spp. is probably low. Restoration potential for managed natural areas or wildlands infested *Ligustrum* spp. is probably moderate. If attacked during the early stages of colonization, the potential for successful management is high.

**Mechanical Controls**

Mowing and cutting are appropriate for small populations or environmentally sensitive areas where herbicides cannot be used. Stems should be cut at least once per growing season as close to ground level as possible. Repeated mowing or cutting will control the spread of *Ligustrum* spp., but may not eradicate it (Tennessee Exotic Pest Plants Council 1996). Managers of The Nature Conservancy preserves in Ohio reported eradication of *L. vulgare* after two cutting treatments (Randall and Rice, unpublished).

*Ligustrum* spp. can be effectively controlled by the manual removal of young seedlings. Plants should be pulled as soon as they are large enough to grasp but before they produce seeds. Seedlings are best pulled after a rain when the soil is loose. Larger stems (up to 6 cm in diameter) can be removed using a weed wrench or similar uprooting tools. The entire root must be removed since broken fragments may resprout (Tennessee Exotic Pest Plants Council 1996).

### Biological Controls

*Ligustrum* spp. have no known biological controls, although a few pathogens are known to attack them in North America. *Cercospora adusta*, *C. lilacis*, and *Pseudocercospora lugustri* are fungal leaf spots that affect *L. vulgare* and *L. amurense*. *Nectriella pironi* creates galls on *L. sinense*, *L. lucidum* and *L. quihoui*. *Pseudomas syringae* impacts members of the olive family including *L. amurense*. *Agrobacterium tumefaciens*, *Ganoderma lucidum* and *Glomerella cingulata* affect *L. vulgare* (Sinclair et al. 1987).

### Herbicides

Foliar Spray Method: This method may be effective for large thickets of *Ligustrum* spp. where risk to non-target species is minimal. Air temperatures should be above 17°C to ensure that herbicides are absorbed. The ideal time to treat is while plants are in leaf in late autumn or early spring but when many native species are dormant.

Glyphosate (brand name Roundup and others): A number of concentrations have been used successfully. The Tennessee Exotic Pest Plants Council (1996) suggests a 2% solution of glyphosate and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves. The New Zealand Weeds Web Site (1999) recommends, for a handgun sprayer, 1 liter Roundup and 100 mls of a surfactant per 100 liters of water (1% solution); for a backpack sprayer, the recommendation is 100 ml Roundup and 20 mls of a surfactant per 10 liters of water. (Roundup is a non-selective herbicide.)

Triclopyr (brand name Garlon, Pathfinder II and others): The Tennessee Exotic Pest Plants Council (1996) suggests a 2% solution of triclopyr and water plus a 0.5% non-ionic surfactant, sprayed to thoroughly wet all leaves. Use a low pressure and coarse spray pattern to reduce spray-drift damage to non-target species. (Triclopyr is a selective herbicide for broadleaf species only.)

Metsulfuron (brand name Escort and others): The New Zealand Weeds Web Site (1999) recommends, for a handgun sprayer, 35 g metsulfuron and 100 mls of a surfactant per 100 liters of water; for a backpack sprayer, the recommendation is 5 g metsulfuron and 10 mls of a surfactant per 10 liters of water. Metsulfuron methyl was identified as the most cost-effective herbicide in an experimental treatment comparing metsulfuron methyl, triclopyr ester and 2,4-D (Madden and Swarbrick 1990). (Metsulfuron is a selective herbicide active upon broadleaf and some annual grass species.)

Cut Stump Method: This control method should be considered when treating individual shrubs or where the presence of desirable species precludes foliar application. The Tennessee Exotic Pest Plants Council (1996) recommends this treatment only as long as the ground is not frozen, but other researchers have found it effective on *Rhamnus* spp. in frozen ground (Reinartz 1997). Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface (Tennessee Exotic Pest Plants Council 1996). Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, to hold the herbicide in for better absorption by plant (New Zealand Weeds Web Site 1999).

Basal Bark Method: Apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line. Like the cut stump application, this method may be effective throughout the year, if *Ligustrum* spp. responds similarly to *Rhamnus* spp. (Reinartz 1997). In New Zealand, researchers have killed standing *Ligustrum* trees by drilling downward-sloping 20 mm wide holes 5 cm into the trunk at no greater than 5 cm spacing around the trunk, and filling the holes with a stump paint-herbicide mix (New Zealand Weeds Web Site 1999).

### Prescribed Burning

Faulkner et al. (1989) reported that in experimental trials of prescribed burning, there was no significant difference in the abundance of *L. sinense* in burned vs. unburned plots. *Ligustrum* litter has a low flammability and fires did not carry well in these treatments.

The Nature Conservancy land managers in Alabama reported that burning top-kills *L. vulgare* and *L. sinense* and eliminates them over time, and that burning is effective at controlling *L. sinense* if done annually with low fuel moisture and high Keetch-Byram Drought Index (Randall and Rice. unpublished).

#### **EXAMPLES OF *LIGUSTRUM* SPP. CONTROL ON TNC PRESERVES**

*Ligustrum* spp. have been reported as problems weeds on TNC preserves in Alabama, Arkansas, Louisiana, Georgia, Florida, Mississippi, Tennessee, North Carolina, and in Ohio.

In Alabama and in Florida, Carlen Emanuel and Greg Seamon, respectively, reported that annual burning was effective in controlling *L. sinense*. Furthermore, cutting is also effective if done when conditions are dry. George Ramseur Jr. in Mississippi found that a combination of pulling and burning provided good control of *L. sinense*.

Richard Martin reports that *L. sinense* is one of the worst weeds on Louisiana preserves, and has found that the application of Garlon 4 (triclopyr) has produced excellent control results, but RoundUp (glyphosate) did not provide good results. In North Carolina, however, Robert Merriam found that RoundUp was useful in controlling large infested areas of *L. sinense*. Additionally, cutting was very effective if coupled with the use of Arsenal (imazapyr) on cut stumps. Rates of herbicide application should follow those recommended by the manufacturer. Rates that have been applied successfully for control of *Ligustrum* are described above.

In Arkansas, Scott Simon reports that burning only top-kills *L. vulgare* and *L. sinense*, but will eventually eliminate the plants over time if burns are repeated. Burning is not effective however, in moist bottomland areas.

*L. vulgare* was successfully controlled in central Ohio preserves. Ross Lebold reported that the cut-stump method, using RoundUp (glyphosate) was effective, and that repeated cutting also seemed effective. In Tennessee, *L. vulgare* was partially controlled by cutting, and Gabby Call reports that the use of goats to control privet works well. The goats however, must be able to reach and destroy adult privet plants.” [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html) (Accessed 18 March 2003).

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References (includes journals, agency/university reports, and internet links):

1. ISSG - <http://www.issg.org/database/species/ecology.asp?si=90&fr=1&sts=>
2. TNC - [http://tncweeds.ucdavis.edu/esadocs/documnts/ligu\\_sp.html](http://tncweeds.ucdavis.edu/esadocs/documnts/ligu_sp.html)
3. ESC - <http://www.esc.nsw.gov.au/weeds/Sheets/trees/T%20Privets.htm>

#### **Available Mapping Information:**

PLANTS - [http://plants.usda.gov/cgi\\_bin/plant\\_profile.cgi?symbol=LISI](http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=LISI)